

Partial English Translation of Japanese Patent Laid-Open Publication No. 2002-293625

[0021]

The insulator 4 is preferably a material having a low Young's modulus such as silicone rubber. In this way, the internal electrodes 2 are alternately insulated every other layer, and the external electrode 5 is formed on the other non-insulated end face of the internal electrode 2 by heat hardening of a conductive thermal resistant adhesive 5a in a state where a conductive portion 5b is brought into close contact with the conductive thermal resistant adhesive 5a applied in advance, for example. A lead wire 6 is attached to the lower end of the external electrode 5.

[0022]

The thickness of the piezoelectric body 1 of the active part 3a is 0.05 to 0.25 mm, the thickness of the internal electrode 2 is 0.003 to 0.01 mm and the thickness of the inactive part 3b is 0.5 to 3.0 mm, respectively. The number of laminations of the piezoelectric body 1 and the internal electrode 2 is 100 to 400 layers, respectively, in order to obtain a desired characteristic.

[0023]

Moreover, in order to prevent creeping discharge between the internal electrodes 2 and to apply a large voltage, the side face of the columnar laminated element body 3 is covered by a covering layer (not shown) made of an insulator such as silicon rubber having an elasticity.

[0024]

The internal electrode 2 is constituted by silver, or silver-palladium or silver-platinum as a main component.

[0025]

And in the present invention, the piezoelectric body 1 is a perovskite type complex oxide consisting essentially of Pb, Zr and Ti and an A site of the perovskite type complex oxide is replaced by not more than 8 mol% with at least one of Ca, Sr and Ba, a B site is replaced by 1.5 to 4.5 mol% in total with W and at least one of Y, Dy, Ho, Er, Tm, Lu and Yb and the ratio A/B site is 0.955 to 0.995.